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SHERARDUCT

THE NEW
RUST PROOF
NON-CORROSIVE
ELECTRICAL
CONDUIT

manufacture

Sherarduct
Conduit

MANUFACTURED BY THE
NATIONAL METAL
MOLDING COMPANY
PITTSBURGH, PA.

SHERARDUCT

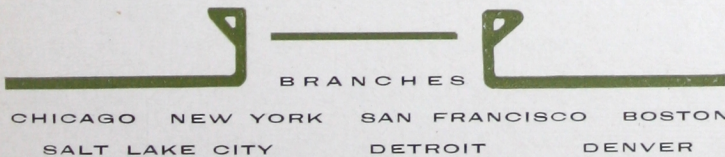
John W. Brown
1847

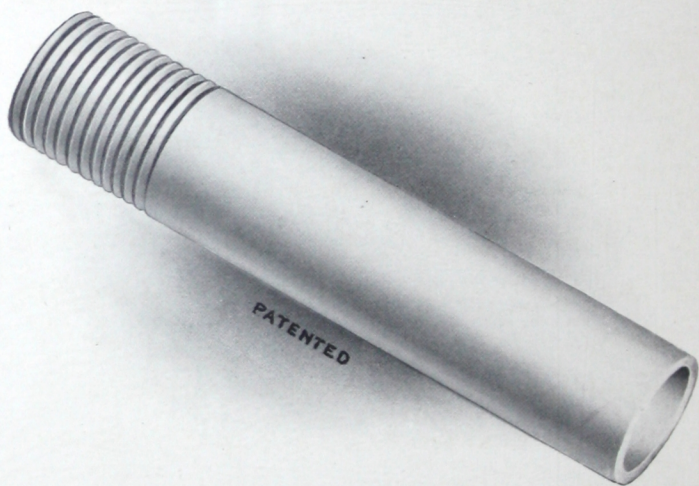
SHERAR DUCT CONDUIT

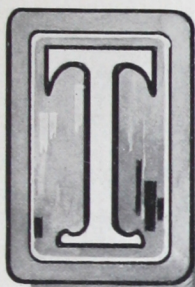


NATIONAL CODE STANDARD

LISTED IN THE LIST OF APPROVED FITTINGS
BY THE UNDERWRITERS' LABORATORIES







HIS conduit is made from the same standard mild steel conduit pipe used in the manufacture of Economy Conduit.

It is not, as sometimes supposed, common steel pipe, but a specially selected tube, chosen for its uniform character and freedom from defects and is manufactured from skelp of proper nature to produce a non-brittle, easy-bending tube.

It is a well founded fact that rust attacks some classes of iron to a greater degree than others, and the chemical properties of the pipe used in Sherarduct are of the nature to permit the least amount of corrosion.

Careful selections and tests are made at our factory and crystalization of metal guarded against to the greatest degree.

The best tube producible for the purpose is covered with oil, scale and some rust which is carefully removed by the pickling process. The pipe is then washed.

One advantage in Sherarduct is that grease or water is an aid to the process rather than a detriment as is the case in other processes where defective spots, or corrosive elements, may be bridged over by

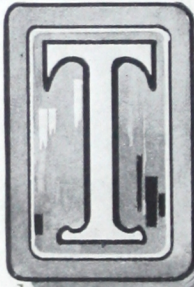
Sherarduct
Pipe

Cleaning
Process

**Damage from
Rust
Incalculable**

the "protective" coating, thus confining or covering the very element desirable to exclude. A pin point of rust so confined will continue to pit the pipe and, if not discovered for many months after the possible installation of the conduit behind marble walls, the damage is incalculable.

After careful cleaning and inspection for the removal of all burrs and uneven surfaces the pipe is then ready for the Sherardizing treatment.



**Sherardizing
Treatment**

THE Sherardizing treatment is a truly wonderful one in which many elements combine to produce wonderful results.

The pipe is placed into huge drums or retorts which are then filled with a fine powdery zinc dust which is of peculiar character—about 90 per cent. pure zinc, 10 per cent. oxide which is not free, but covering the pure zinc particles.

The drums are then closed air tight, rolled into the ovens and "tumbled," while the temperature is gradually brought to about 600 degrees F. and is gradually returned to normal when the tube is removed after cooling and is found coated with a mat gray finish of pure zinc.

The outer coating of zinc but covers the effective non-corrosive value of the process which is the zinc iron alloy. This alloy, so to speak, is an amalgamation of the zinc and iron. The zinc dust is driven into the pores of the iron and over this is the coating of pure zinc.

This method does not cover up bad spots, acid spots nor corrosive agents, but acting directly opposite to other processes, detects or makes more prominent any defects which are then thrown out. The chemical action of the process in the driving into the iron of this pure zinc destroys the corrosive elements, which may be invisibly retained on or in

**Sherardizing
Detects
Bad Spots**

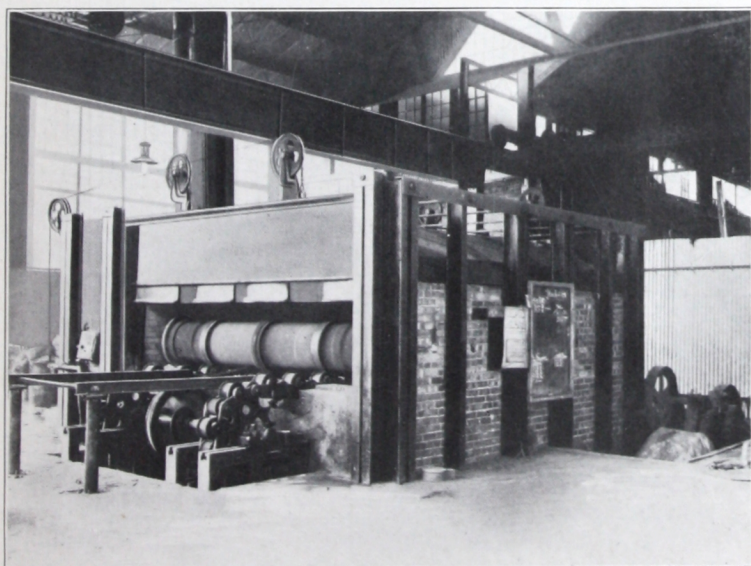


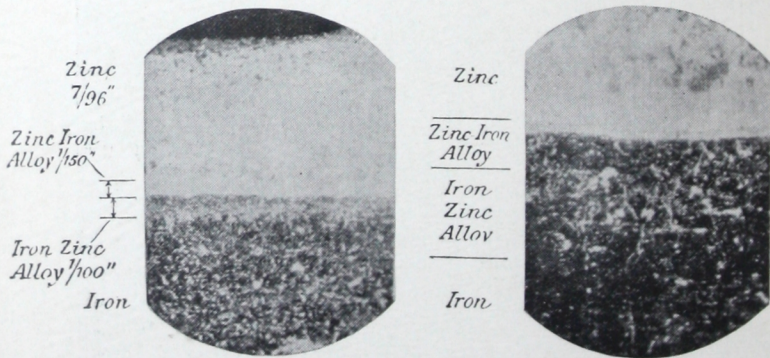
Photo shows open oven with drum or retort inside.
Showing "Sherardizing" of conduit.

Both Sides
Sherardized

the pipe when placed in the drums, thus producing a conduit which is free from hidden defects.

Both sides of the tube are alloyed and coated exactly alike and are absolutely uniform without ruffle or break, the surface being smooth for the entire length of pipe which is not possible with any other process.

Unlike any other method of treatment of tube, the process is *not a surface coating*, but is part and parcel of the pipe and is inseparable. The zinc is so intimately rooted that it is *impossible to separate it either chemically or mechanically* without removing the original surface. This is the first attainment in the production of a rust proof conduit and is obtained by the very nature of the surface itself.



Microscopical Sections showing (one side)
the alloying of iron.

It is perhaps easier to comprehend the nature of the process by reference to the microscopical sec-

tions illustrated herewith, showing the alloying of the coating with the iron of the article. It must be understood, however, that both sides of the tube, inside and outside, are simultaneously and identically treated alike.



SHERARDIZED CONDUIT is a **Final Process** rust proof tube without further treatment, but it is desired, however, to eliminate every possible opportunity for corrosion and a special

final treatment is given the conduit which consists of dipping in an oil which resists the action of such acids as are found in cinder concrete which would dissolve the pure zinc coating. Zinc, however applied, is of a porous character except in the alloy found under the outer coating of Sherarduct, and by impregnating the outer coating of Sherarduct the pores of zinc are sealed and an outer coating given which effectively resists acid action.

Sherarduct Conduit, because of the gradual **Bending** heating to approximately 600 degrees F. and the gradual cooling, is annealed. This produces an easy bending pipe much more pliable and workable than any other tube. It means a considerable item in

**Saving in
Labor**

labor and permits of more bends in the pipe, therefore fewer elbows and naturally a lesser number of couples. Wherever bends cannot be made, it is necessary to cut and rethread the pipe which naturally lays every cut open to rust, and greatly increases labor cost on the job. It is safe to estimate a 10 per cent. loss on the average job due to stiff pipe, excess elbows, cutting and rethreading.

**No Flaking
Nor
Cracking**

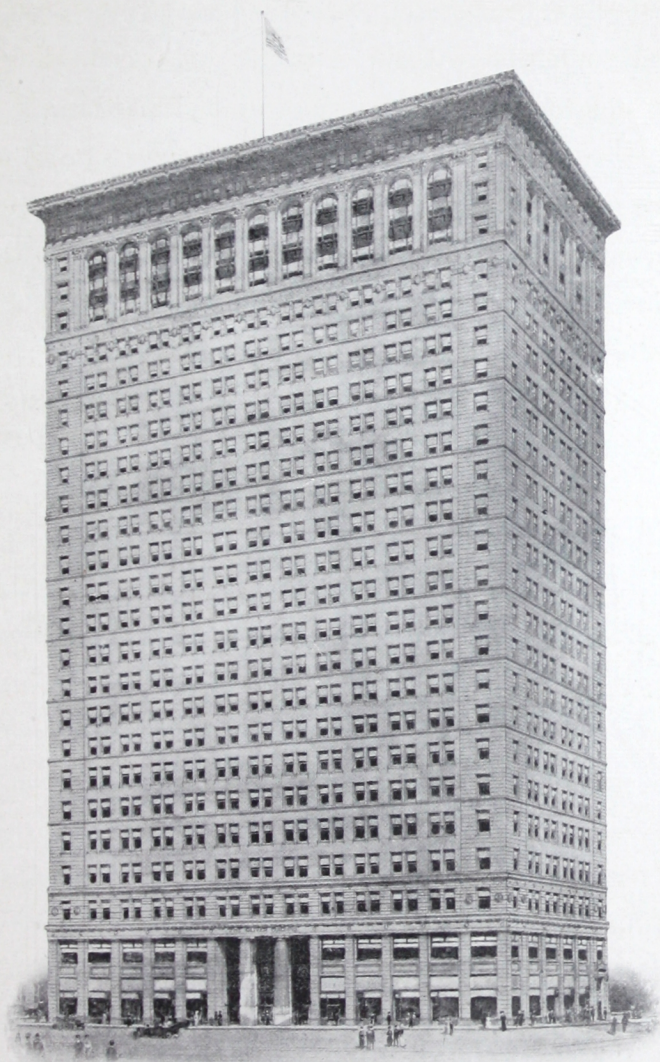
Sherarduct, not having a surface coating, will not flake nor crack on sharp bends. The alloy is permanent and neither sharp bends, hammering nor tools of workman will expose iron surfaces. This is unique in conduit, as never before has the protective coating shown much value against abrasion. And upon this point depends largely the possibilities of a rust proof pipe installation.

Threads

The threads of Sherarduct Conduit are rust proof and retain their original size and sharpness. Unlike other processes the threads are sharp and clean, free from foreign substances.

A watch screw may be taken from a watch, Sherardized and returned to its original space without rethreading.

Examination of any conduit job shows rust at the threads, and as this is the weakest part of a conduit tube should be the best protected. Sherarduct



THE OLIVER BUILDING, PITTSBURGH, PA.

One of the largest and finest office buildings in the middle west. It is equipped throughout with Sherarduct, the only absolutely rustproof conduit manufactured. One hundred years hence the conduit installation in the Oliver Building will be as good as today.

Importance
of
Clean
Threads

threads are as perfectly protected as the pipe proper and cannot be rusted.

The importance of proper and clean threads is considered, not only from a labor-saving point of wiring, but the rules governing conduit work require grounding of every length of pipe, and unless the threads are clean and perfect electrical connection established, the "ground" is imperfect and the labor doubled in the effort to properly ground the conduit system.



Fishing

CONTRACTOR very aptly stated "That conduit people should finish the job and not leave it to the contractor to do half."

Sherarduct represents the finished job. No detail is left for others. By the cleaning process we eliminate scale, by our factory inspection we eliminate burrs and the Sherardizing process produces a conduit which is uniformly smooth to the point of perfection.

We, however, go farther to produce a fishing surface which is easier fished than any other, and actual tests, one of which we publish herewith, proves conclusively that we have succeeded.

No. of Feet Pulled	Sherarduct Conduit Bent, Pounds Pull	Enameled Conduit Bent, Pounds Pull	Sherarduct Conduit Straight, Pounds Pull	Enameled Conduit Straight, Pounds Pull
10	6	10	4	6
20	8	10	6	7
30	9	11	6	7
40	9	13	7	8
50	10	13	8	8
60	11	14	8	8
70	11	16	8	9
80	23	24	8	10
90	25	28	9	11
100	25	28	9	11

Conduit was tested on one continuous pull for each length, but pounds pull was noted and recorded for each ten feet pulled.

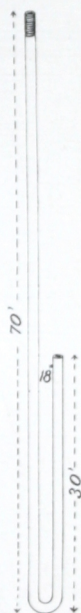
Copies of other tests, under various circumstances and conditions, will be gladly furnished.

Sherarduct Conduit interior has identically the same treatment as the outside and our special process accomplishes two purposes—it makes the tube acid proof and is easier fished.

Mr. Louis J. Auerbacher in his article "Wiring With Interior Conduit" published in the *Electrical World*, Nov. 2, 1907, states: "In very warm places where if the conduit is too small and the lining softens because of the heat, the removal of the wires becomes very difficult indeed."

Conduits are used as a protective raceway for electrical conductors and wires must be pulled only after complete conduit installation and it is the

Fishing Tests

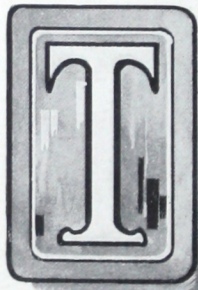


Sketch shows manner in which conduit was bent in above tests.

intent and purpose to provide for the renewal of conductors at future periods.

**Sherarduct
Labor
Economy**

This is an important item of labor economy which the contractor should not overlook as many hours of labor are charged up on a contract job while the workmen are vainly endeavoring to pull wires and cables through conduit which do not fish properly.



THE intention as stated above is that conduit shall stand as a permanent raceway for wires and the question of rust and corrosion leads to the point of whether new conduit will have to be put around the wires after short periods.

**Rusting and
Corrosion**

Corrosion of conduit upon the interior is but a step from a corrosive exterior. Rust takes more space than iron and anyone familiar with conduit work has recognized the raised enameled surfaces—"warts"—caused by rust growing, finally bursting through the enamel and laying the iron open to continued and increased rusting.

Corrosion is an all important item in large structures and the point of cost of conduit is a

small item compared with total cost of building and ultimate damage done if necessary to remove.

Many cases have been found where the conduit was well rusted before installed in the building, others where less than 25 per cent. of the protective coating remained on the conduit by the time it was installed.

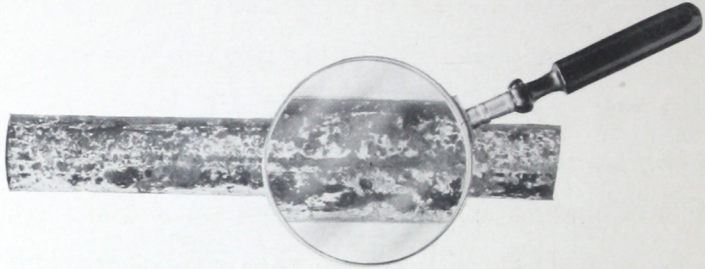
Sherarduct Conduit has not only a sound protective coating, but under its pure zinc surface is a zinc iron alloy which under every standard test of time in weather, steam, earth, lake water, salt water, acid and acid fumes has proven absolutely proof against corrosion.

**Sherarduct
Proof
Against
Corrosion**

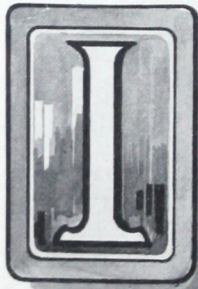
No other process discovered is equal to the Sherardizing Process and to briefly review the reasons is hard because of the broad scientific nature of the subject "Corrosion and its prevention." The one definite settled fact which stands out in the limelight is that surface coatings are only of value to a certain limit below which the coating is worthless as a protection.

Corrosion may shoot from a pin point and in some instances openings in protective coatings found to measure 1/10,000 of an inch have started corrosion which continued to eat its way underneath the pro-

tective coating and deposit or break through as the rust grew, but the more serious items are the bridging over of acids used in cleaning the pipe thus closing in under the surface of salts which immediately produce deleterious action.



Sample Conduit taken from \$3,000,000 building. Shows rusty condition. Building not completed when conduit taken from job.



INFERIOR examples of enameled conduit show lack of care in manufacture to produce these results but the principal fact remains that no protective coating, where it is a surface coating, can withstand the abrasion necessary to its installation in the job.

**The Ideal
Condition**

In Sherarduct Conduit the ideal condition prevails in that as one expert described the results of his findings or tests "An alloy is a solution of metals; in the case of Sherardizing the zinc, in a finely divided state, is absorbed into the metallic mass with



Sample Conduit protected with "protective" surface coating after one year's service where acid fumes prevail.

which it is intact. The articles might be said to be case-hardened."

Exhaustive tests have been made on Sherarduct Conduit extending over a period of a year and a half and will be gladly furnished to anyone interested.

Tests

The three elements of corrosion—Carbonic Acid, Hydrogen-peroxide and Electrolysis have forced themselves into every place in the earth and above, and our exhaustive tests lead us to believe we have produced a conduit proof against these destructive agents.

"Sherarduct" is included in the list of materials examined under the Standard Requirements of the National Board of Fire Underwriters by the Underwriters' National Electric Association, after exhaustive tests by the Underwriters' Laboratories, and approved for use.

Code
Standard



Supply

SHERARDUCT CONDUIT is manufactured at Economy, Pa., where we have established the largest Sherardizing plant in America and where large quantities of Sherarduct are constantly on hand. We also carry large stocks at convenient shipping points, Chicago, New York, Boston and San Francisco.

Inquiries should be addressed to nearest branch house. Samples gladly furnished and a special representative of the Company will call upon anyone desiring to purchase.

